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### **3.0 AFFECTED ENVIRONMENT**

#### **3.1 INTRODUCTION**

Chapter 1.0 of this environmental assessment (EA) introduced the West Tavaputs Plateau Drilling Program (WTPDP) and the various land use plans and regulations that apply to the project. Chapter 2.0 described in detail the Proposed Action, Alternative C, a No Action Alternative, and other alternatives considered but not analyzed further. This chapter presents a description of the existing environment potentially affected by the Alternatives described in Chapter 2.0 and is the baseline for Chapter 4.0.

#### **3.2 GENERAL SETTING**

The West Tavaputs Plateau Project Area (WTPPA) is located in northeastern Carbon County and southern Duchesne County Utah on the West Tavaputs Plateau. It is an area rich in history, with cultural sites dating habitation by Native Americans as long as 10,000 years ago. Average annual precipitation ranges from 10 inches in the lower elevations to 30 inches in the higher elevations. Elevations in the WTPPA range from approximately 5,000 feet in the canyon bottoms to 8,200 feet on the plateau. Vegetative cover is comprised primarily of pinion pine and juniper, but there are areas of aspen, pine, and fir and openings of upland grass/sagebrush. Deep rugged canyons divide the area. Drainage is northeast to Nine Mile Creek and directly to the Green River. Riparian areas occur along Nine Mile Creek and along the bottoms of the major canyons draining into Nine Mile Creek. The WTPPA is used for livestock grazing, wildlife habitat, wild horse habitat, recreation/hunting, and oil and gas production. Ninety percent of the surface is under the jurisdiction of the Bureau of Land Management (BLM) Price Field Office.

There are 61 oil and gas wells within and immediately adjacent to the WTPPA, of which 27 are capable of producing natural gas. Thirteen of the 27 wells are currently producing, whereas the other 14 would require either an upgrade of delivery lines or recompletion before they could produce. The remaining 34 wells are abandoned. Two of the 13 producing wells and eight abandoned wells are located within the boundaries of two Wilderness Study Areas (WSAs). Two dirt landing strips have been constructed on the plateau but are seldom used. In addition to existing access roads, there are numerous cross-country roads (two-tracks) and hunter camps on the plateau portion of the WTPPA. The Nine Mile Canyon road passes through developed private lands with irrigated agricultural fields, farm and ranch houses, barns,

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fences, and other facilities. An existing steel natural gas line parallels the road and is visible from the Nine Mile Canyon Road for about 7 miles in the WTPPA. In addition to recreational visitation in the area, local residents, Bill Barrett Corporation (BBC), and logging interests currently use the existing road system for the maintenance of private property, livestock grazing, existing gas development, and resource extraction.

### 3.3 RESOURCES/ISSUES BROUGHT FORWARD FOR ANALYSIS

#### 3.3.1 Air Quality

The WTPPA is located in central Utah east of the Wasatch Mountains and is characterized by hot dry summers and cold dry winters. Meteorological measurements collected at Nutters Ranch, Utah (1963-1986 period of record), approximately 0.3 mile south of the WTPPA, indicate that average annual precipitation is 11.6 inches, ranging from 6.4 inches (1974) to 24.8 inches (1965) (Table 3.1). Precipitation is highest from late spring to early fall, with the peak monthly average of 1.4 inches

Table 3.1 Nutters Ranch, Utah, Mean Monthly Temperature Ranges and Average Precipitation Amounts, 1953-1986.<sup>1</sup>

Month	Average Temperature Range (°F)	Average Precipitation (inches)	Average Snowfall (inches)
January	6 – 35	0.6	6.1
February	12 – 42	0.5	9.0
March	22 – 52	1.2	6.1
April	30 – 61	1.0	4.1
May	39 – 72	1.1	0.6
June	46 – 81	0.9	0.0
July	54 – 88	1.2	0.0
August	51 – 85	1.4	0.0
September	42 – 77	1.1	0.5
October	31 – 65	1.2	1.3
November	20 – 49	0.7	5.4
December	9 – 37	0.9	12.4
Annual	30.2 – 62.1 (mean)	11.6 (mean)	45.6 (mean)

<sup>1</sup> Source: Western Regional Climate Center (2004).

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occurring in August. An average of 45.6 inches of snow falls during the year, with heaviest snowfall in December and February. The National Weather Station at Price is recording its eighth consecutive year of below-normal precipitation. Water tables are low, and many springs have stopped flowing.

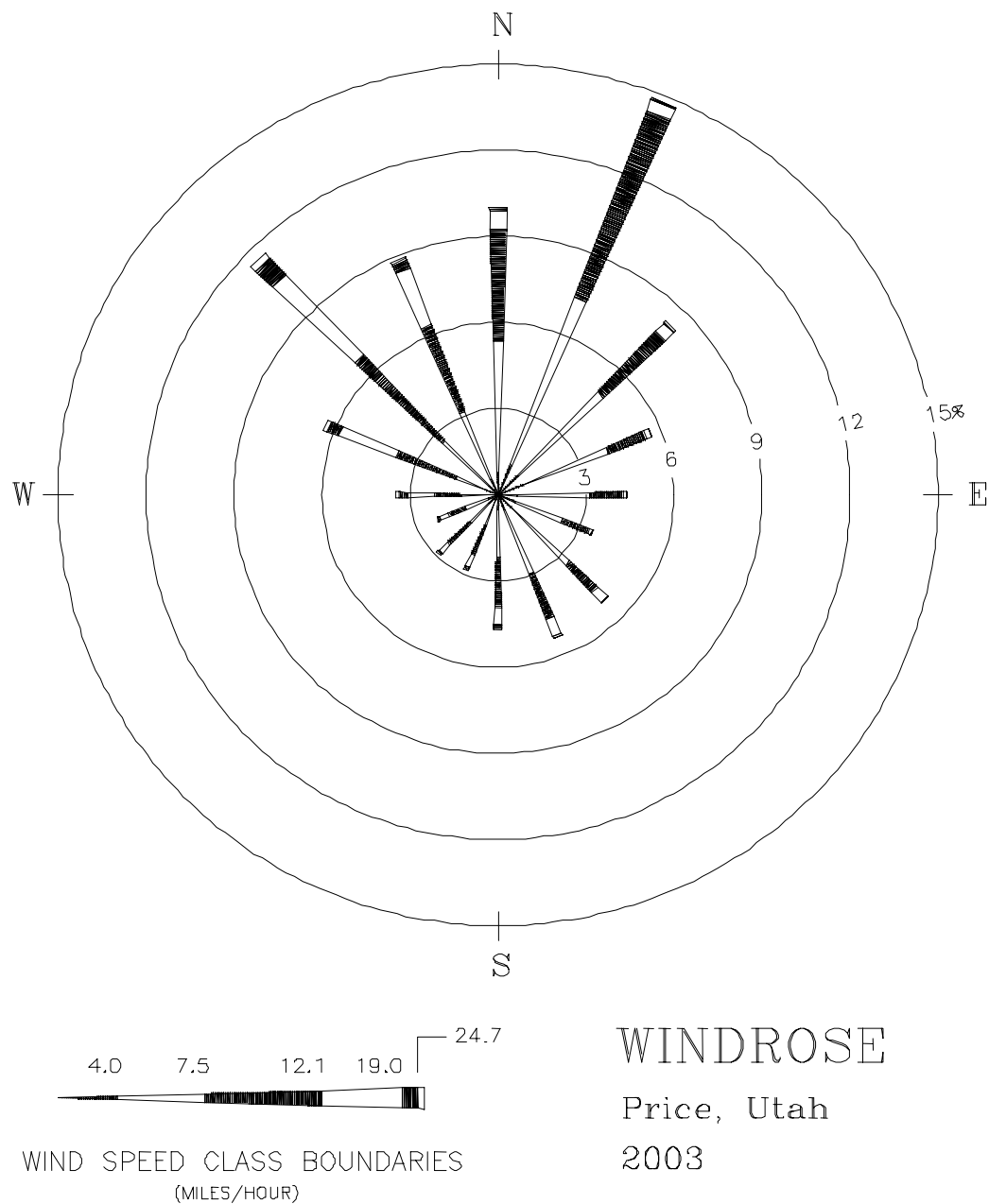
Temperatures are generally cooler, frost-free periods shorter, and precipitation and snowfall greater at higher elevations. The region is typically cool, with average daily temperatures ranging between 6°F (low) and 35°F (high) in mid-winter and between 54°F (low) and 88°F (high) in mid-summer. Extreme temperatures have ranged from -25°F (1971) to 100°F (1976). The frost-free period (above 32°F) generally lasts from late May to early October. The WTPPA is subject to prolonged and intense temperature inversions, especially during the winter months.

The proximity of the Wasatch Mountains and the nearby complex terrain influence the air movement in the WTPPA. The closest comprehensive wind measurements are collected at the Carbon County airport in Price, Utah, approximately 30 miles southwest of the WTPPA. Figure 3.1 presents the relative frequency of winds, distribution by speed class, and direction of the wind source. Winds originate from the northwest to northeast more than 50 percent of the time, and the average annual wind speed is 7 miles per hour.

The Utah and National Ambient Air Quality Standards set absolute upper limits for specific air pollutant concentrations at all locations where the public has access. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, whereas increases allowed in Class II areas are less strict. The WTPPA and surrounding areas are classified as PSD Class II. Three PSD Class I areas--Arches National Park, Canyonlands National Park and Capital Reef National Park--lie approximately 60, 80, and 98 miles, respectively, south of the WTPPA. Applicable Utah and National Ambient Air Quality Standards and PSD Class I and II increments are presented in Table 3.2.

All *National Environmental Policy Act* (NEPA) analysis comparisons to PSD Class I and II increments are intended to evaluate a threshold of concern and do not represent a regulatory PSD increment consumption analysis. The determination of PSD increment consumption is an air quality regulatory agency responsibility. Such an analysis would be conducted to determine minor source increment consumption or, for major sources, as part of the New Source Review process. The New Source Review

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NOTES:  
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 OCCURRENCE OF EACH WIND DIRECTION.  
 WIND DIRECTION IS THE DIRECTION  
 FROM WHICH THE WIND IS BLOWING.  
 EXAMPLE - WIND IS BLOWING FROM THE  
 NORTH 10.0 PERCENT OF THE TIME.

BEE-LINE  
 SOFTWARE

Figure 3.1 Wind Rose for the West Tavaputs Plateau Project Area.

Table 3.2 State and Federal Ambient Air Quality Standards and PSD Increments.<sup>1</sup>

Pollutant/ Averaging Time	Monitored Background Concentration	State and National Ambient Air Quality Standard	Incremental Increase Above Legal Baseline PSD Class I	Incremental Increase Above Legal Baseline PSD Class II
Carbon Monoxide (CO) <sup>2</sup>				
1-hour	8,000 µg/m <sup>3</sup>	40,000 µg/m <sup>3</sup>	n/a	n/a
8-hour	2,000 µg/m <sup>3</sup>	10,000 µg/m <sup>3</sup>	n/a	n/a
Nitrogen Dioxide (NO <sub>2</sub> ) <sup>3</sup>				
Annual	10-18 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>	2.5 µg/m <sup>3</sup>	25 µg/m <sup>3</sup>
Ozone (O <sub>3</sub> ) <sup>4</sup>				
1-hour	0.077 ppm	0.12 ppm	n/a	n/a
8-hour	0.072 ppm	0.08 ppm	n/a	n/a
Particulate Matter (PM <sub>10</sub> ) <sup>5</sup>				
24-hour	11-30 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	8 µg/m <sup>3</sup>	30 µg/m <sup>3</sup>
Annual	13 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	4 µg/m <sup>3</sup>	17 µg/m <sup>3</sup>

<sup>1</sup> n/a = not applicable; µg/m<sup>3</sup> = micrograms per cubic meter; ppm = parts per million.

<sup>2</sup> From UDAQ.

<sup>3</sup> Monitored at Castle Dale, Utah, 1977-1981.

<sup>4</sup> Monitored at Canyonlands National Park, 2002.

<sup>5</sup> Monitored at Sunnyside, Utah, 1994.

process would include an evaluation of potential impacts to Air Quality-Related Values (AQRV) such as visibility, aquatic ecosystems, flora, fauna, etc., performed under the direction of federal land managers.

Although air quality monitoring has not been conducted within the WTPPA, air quality conditions are likely to be good because of the limited number of air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good conditions for atmospheric dispersion. Existing conditions are compared to Natural Ambient Air Quality Standards in Table 3.2.

Three large coal-fired electrical generating stations--the Castle Gate, Huntington, and Hunter Plants--influence air quality and visibility in the Book Cliffs and south to Capitol Reef and Canyonlands

National Parks. Continuous visibility-related optical background data have been collected at Capital Reef and Canyonlands National Parks as part of the Interagency Monitoring of Protected Visual Environments (IMPROVE) program. Visibility in the central Rocky Mountains is very good (averaging over 70 miles Standard Visual Range), with fine particle impacts accounting for nearly half of the average degradation (Sisler 1996).

### **3.3.2 Cultural Resources/Native American Religious Concerns**

Nine Mile Canyon, Cottonwood Canyon, and Dry Canyon are under consideration for historic register designation, and the WTPPA and associated access routes are within, or adjacent to, the Nine Mile Canyon Special Recreation and Cultural Management Area (SRCMA) (BLM 1995a). The purpose of SRCMA is to protect and enhance cultural resources within the canyon while enhancing the canyon's scenic, recreation, and watchable wildlife values. BLM lands in Nine Mile Canyon are eligible for listing on the National Register of Historic Places (NRHP) and are in consideration for designation as a National Historic District. Special management area designation and/or historic register designation has been specifically identified in the *Price River Management Framework Plan and Summary* (Price MFP) (BLM 1984a) for these canyons. NRHP eligibility is due to the quality and quantity of prehistoric remains representing the changing way of life over thousands of years. This includes rock art and Fremont cultural and Ute Tribal remains of national importance, as well as the remains of the historical period reflecting on the local, state, and national level in context to transportation, communication, settlement, farming, ranching, and military history.

Montgomery Archaeological Consultants (MOAC) conducted a cultural resource inventory in 2002, 2003, and 2004 of areas directly related to the WTPDP (Patterson 2004). On the pipeline corridor between the Water Canyon and Sage Brush Flat compressor stations, MOAC recorded 36 new archaeological sites and 19 that were previously recorded. Along the Dry Canyon pipeline, 17 newly discovered sites and 14 previously recorded sites were documented. On the Sage Brush Flat to Peters Point pipeline, eight newly discovered sites were recorded. File searches at the BLM Price Field Office indicated that sites had also been previously recorded in this project area, but these sites could not be relocated. Four newly discovered sites were recorded in the area of five proposed wells near Peters Point and Flat Iron Mesa. The Tavaputs Plateau Exploratory Drilling Program recorded an additional 12 newly discovered sites and five that had been previously recorded on proposed well pad locations. These projects encompass 38 previously recorded sites (Table 3.3) and 77 newly discovered sites (Table 3.4).

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Table 3.3 Previously Recorded Sites in the WTPPA.

Site Number	Site Type	Eligibility for NRHP
42Cb996	Lithic Scatter	Eligible
42Cb1722	Historic Temporary Camp	Not Eligible
42Cb1732	Historic Fence and Corrals	Eligible
42Cb1751	Lithic Scatter	Not Eligible
42Cb1753	Lithic Scatter	Eligible
42Cb0016	Rockshelter (Rasmussen Cave)	Eligible
42Cb0017	Prehistoric Rock Art	Eligible
42Cb0264	Rock Shelter	Eligible
42Cb0721	Rock Shelter	Eligible
42Cb0722	Rock Structure	Eligible
42Cb0752	Prehistoric Rock Art	Eligible
42Cb0793	Homestead	Eligible
42Cb0805	Habitation Site	Eligible
42Cb0815	Lithic Scatter	Eligible
42Cb0816	Prehistoric Rock Art	Eligible
42Cb0817	Prehistoric Rock Art	Eligible
42Cb0828	Historic Corral	Eligible
42Cb0877	Prehistoric Rock Art	Eligible
42Cb0883	Prehistoric Rock Art	Eligible
42Cb0884	Prehistoric Rock Art	Eligible
42Cb0886	Prehistoric Rock Art	Eligible
42Cb0889	Prehistoric Rock Art/Rock Wall	Eligible
42Cb0891	Prehistoric Rock Art/Rock Structure	Eligible
42Cb2001	Rock Pile	Not Eligible
42Cb746	Prehistoric Rock Art	Eligible
42Cb1048	Prehistoric Rock Wall	Eligible
42Cb40	Prehistoric Habitation	Eligible
42Cb48	Fremont Granaries	Eligible
42Cb35	Prehistoric Rock Art	Eligible
42Cb31	Prehistoric Rock Art	Eligible
42Cb50	Prehistoric Rock Art	Eligible
42Cb53	Prehistoric Rock Art	Eligible
42Cb33	Fremont Granary	Eligible
42Cb1757	Fremont Habitation	Eligible
42Cb30	Fremont Habitation/Prehistoric Rock Art	Eligible
42Cb36	Fremont Granary/Prehistoric Rock Art	Eligible
42Cb51	Fremont Rock Shelter/Prehistoric Rock Art	Eligible
42Cb1757	Historic Lambing Pen/Fremont Field Terrace	Eligible

Table 3.4 Newly Discovered Sites in the WTPPA.

Site Number	Site Type	Eligibility for NRHP
42Cb1861	Prehistoric Temporary Camp	Eligible
42Cb1928	Lithic Scatter	Eligible
42Cb1909	Dual Component – Lithic and Ceramic Scatter and Historic Corral	Eligible
42Cb1910	Lithic Scatter	Eligible
42Cb1926	Lithic Scatter	Eligible
42Cb1927	Lithic Scatter	Eligible
42Cb1862	Lithic Scatter and hearth feature	Eligible
42Cb1863	Dual Component – Historic Corral and Lithic Flake/Possible Prehistoric Hearth Feature	Not Eligible
42Cb1930	Lithic Scatter	Eligible
42Cb1931	Lithic Scatter	Eligible
42Cb1929	Prehistoric Stone Wall	Eligible
42Cb1864	Lithic Scatter	Eligible
42Cb2018	Prehistoric Habitation Structure	Eligible
42Cb2019	Prehistoric Rock Art	Eligible
42Cb2020	Prehistoric Rock Art	Eligible
42Cb2021	Prehistoric Rock Art	Eligible
42Cb2022	Prehistoric Rock Art	Eligible
42Cb2023	Prehistoric Rock Art	Eligible
42Cb2024	Prehistoric Rock Art	Eligible
42Cb2025	Prehistoric Rock Art	Eligible
42Cb2026	Prehistoric Rock Art	Eligible
42Cb2027	Prehistoric Rock Art	Eligible
42Cb2028	Prehistoric Rock Art	Eligible
42Cb2029	Prehistoric Rock Art	Eligible
42Cb2030	Prehistoric Rock Art	Eligible
42Cb2031	Historic Rock Alignment and Hearth	Not Eligible
42Cb2032	Stained Soil Concentrations	Not Eligible
42Cb2033	Prehistoric Rock Art	Eligible
42Cb2034	Prehistoric Rock Art	Eligible
42Cb2035	Historic Inscriptions	Not Eligible
42Cb2036	Prehistoric Rock Art	Eligible
42Cb2037	Prehistoric Rock Art	Eligible
42Cb2038	Prehistoric Rock Art	Eligible
42Cb2039	Prehistoric Rock Art	Eligible
42Cb2040	Prehistoric Rock Art	Eligible
42Cb2041	Prehistoric Rock Art	Eligible
42Cb2042	Prehistoric Rock Art	Eligible
42Cb2043	Habitation Site	Eligible
42Cb2044	Prehistoric Rock Art	Eligible
42Cb2045	Fire-cracked Rock Scatter	Not Eligible



Table 3.4 (Continued)

Site Number	Site Type	Eligibility for NRHP
42Cb2046	Prehistoric Rock Art	Eligible
42Cb2047	Prehistoric Rock Art and Cist	Eligible
42Cb2048	Lithic Scatter	Not Eligible
42Cb2049	Lithic Scatter and Stained Soil Features	Eligible
42Cb2050	Lithic Scatter	Eligible
42Cb2051	Lithic Scatter	Eligible
42Cb2052	Historic Cairn	Not Eligible
42Cb2053	Lithic and Ceramic Scatter	Eligible
42Cb2054	Historic Livestock Fence	Not Eligible
42Cb2055	Historic Livestock Fence	Eligible
42Cb2056	Historic Cairn	Not Eligible
42Cb2057	Prehistoric Rock Art	Eligible
42Cb2058	Historic Livestock Fence	Not Eligible
42Cb2059	Fremont Granary	Eligible
42Cb2060	Prehistoric Cists	Eligible
42Cb2061	Fremont Habitation	Eligible
42Cb2062	Fremont Granaries	Eligible
42Cb2063	Prehistoric Rock Art	Eligible
42Cb2064	Prehistoric Rock Art	Eligible
42Cb2065	Prehistoric Rock Art	Eligible
42Cb2066	Prehistoric Rock Art	Eligible
42Cb2067	Historic Rock Art	Not Eligible
42Cb2068	Prehistoric Rock Shelter	Eligible
42Cb2069	Prehistoric Dry-laid Wall	Eligible
42Cb2070	Prehistoric Rock Shelter	Eligible
42Cb2074	Lithic Scatter	Not Eligible
42Cb2075	Prehistoric Temporary Camp	Eligible
42Cb2076	Lithic Scatter	Not Eligible
42Cb2077	Lithic Scatter	Not Eligible
42Cb2078	Lithic Scatter	Not Eligible
42Cb2079	Lithic Scatter	Not Eligible
42Cb2080	Lithic Scatter	Eligible
42Cb2081	Lithic Scatter	Not Eligible
42Cb2082	Lithic Scatter	Not Eligible
42Cb2083	Lithic Scatter	Not Eligible
42Cb2084	Prehistoric Temporary Camp	Eligible
42Cb2085	Prehistoric Temporary Camp	Eligible

The pipeline route for Alternative A was partially surveyed. An explanation of this partial survey is found on page 4-6. Recorded sites include one historic temporary camp, one historic fence/corral system, one historic corral, three historic livestock fences, one homestead, one historic rock alignment and hearth, one historic inscription site, one historic rock art site, two historic cairns, 23 lithic scatters, one lithic scatter with stained soil features, one lithic scatter and hearth feature, one lithic and ceramic scatter, one stained soil concentration site, one fire-cracked rock scatter, five rockshelter sites (including Rasmussen Cave), 41 rock art sites, one rock art/rock wall site, one rock art/rock structure site, one prehistoric rock art site with a cist, one prehistoric cist site, one rock structure, one rock pile, three prehistoric rock walls, four prehistoric temporary camps, three prehistoric habitation sites, one prehistoric habitation structure, four Fremont granary sites, one Fremont granary with rock art, two Fremont habitation sites, one Fremont habitation site with rock art, one Fremont rockshelter with rock art, one historic lambing pen/Fremont field terrace, one dual component (historic corral/lithic flake and possible hearth feature), and one dual component (lithic and ceramic scatter/historic corral).

Thirty-five previously documented sites within the WTPPA were assessed as eligible to the NRHP; MOAC recommended that Site 42Cb1753 (one of the 35), which had previously been assessed as not eligible (Byers 2002), be changed to eligible. Three previously recorded sites (Sites 42Cb1722, 42Cb1751, and 42Cb2001) are not eligible.

Fifty-eight of the newly documented sites within the WTPPA are recommended as eligible to the NRHP, whereas 19 are ineligible. The historic structures and prehistoric sites within the project area have the potential to yield additional research information relevant to the history of the WTPPA, and most are therefore regarded as eligible for the NRHP under Criterion D. A number of the prehistoric sites can also be eligible under Criterion C because they include diagnostic forms of Native American art and/or technology/architecture.

The *National Historic Preservation Act* (NHPA) recognizes the importance of prehistoric/historic resources and directs federal agencies to assist in efforts towards historic preservation. It also directs the Secretary of the Interior to expand and maintain the NRHP. Section 106 of the NHPA directs the heads of federal agencies to take into account the effects of undertakings on federal lands (or implemented with federal monies) on NRHP-eligible cultural resources and to afford the Advisory Council on Historic Places an opportunity to comment. The Section 106 consultation process has been completed.

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Numerous rock art sites, in and outside of the WTPPA, have the potential to be damaged by increased dust levels caused by the traffic and construction associated with the WTPDP. Dust abatement is planned for this project. Additional actions have been taken or recommended in order to ensure the protection of specific sites/areas in the proposed drilling program and pipeline impact areas. These actions include the construction of fences near Sites 42Cb996, 42Cb1928, and 42Cb2085; access has been re-routed to avoid Sites 42Cb1862, 42Cb1863, 42Cb1909, 42Cb1927, 42Cb1928, 42Cb1929, and 42Cb1930; and monitoring has been recommended for construction near Sites 42Cb1753, 42Cb1927, and 42Cb2085 and proposed well locations PP 24-12, PP 5-13, PP 21-2, and PP 18-3. In the 300-foot corridors along the BBC gas pipeline routes; between the Water Canyon and Sagebrush Flat compressor stations, Sagebrush Flat to Peters Point, and the Dry Canyon pipeline, all of the sites are completely or partially within the area of potential effect. However, all known sites would be avoided by the proposed undertaking. Site 42Cb2085 is the only site along the pipelines for which specific avoidance actions have been recommended. There remains a possibility of encountering subsurface sites.

Vandalism of cultural resources in the WTPPA and vicinity is currently at low levels.

Federal regulations stipulate that federal agencies must consult with Native Americans concerning cultural and religious values, beliefs, practices, and properties that may be affected by federal actions. These regulations stem from the NEPA, NHPA, the *Native American Graves Protection and Repatriation Act* (NAGPRA), the *American Indian Religious Freedom Act* (AIRFA), and Executive Orders 13007 (Indian Sacred Sites) and 13175 (Consultation and Coordination with Indian Tribal Governments). Specific traditional or religious use areas and site types that are often considered during this consultation process may include, but are not limited to, archaeological sites, rock art, traditional resource gathering areas, water sources, burial sites, and natural features such as mountains and plateaus.

The BLM Price Field Office has identified 10 federally recognized Native American Tribes and affiliate Tribal historic preservation and chapter offices that have traditional ties to lands within or in the vicinity of the WTPPA. These Tribes and agencies include Hopi Tribal Council (Hopi Cultural Preservation Office), Paiute Indian Tribe of Utah, Kaibab Paiute Tribe, Navajo Nation (Navajo Historic Preservation Office--Aneth Chapter, Oljato Chapter, Dennehotso Chapter, and Mexican Water Chapter), Pueblo of Laguna, Pueblo of Nambe, Pueblo of Zia, Pueblo of Zuni, Uintah and Ouray Tribal Business Committee, and Southern Ute Tribe.

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A total of eight tribal organizations responded to the request to consult. The Hopi Cultural Preservation Office, Navajo Nation Historic Preservation Office, and Uintah and Ouray Cultural Rights and Protection Program requested field visits to the proposed project area. The Southern Ute NAGPRA Coordinator and the Kaibab Paiute Tribe Cultural Resources Director deferred project consultation to the Uintah and Ouray Ute Indian Tribe. The Paiute Indian Tribe Cultural Resources Director and the Pueblo of Nambe NAGPRA Representative requested to be contacted in the event of unanticipated discoveries of human remains during construction. The Navajo Nation Mexican Water Chapter Coordinator commented that the chapter does not need to consult further regarding the proposed project.

The BLM-Price Field Office responded to the request to consult by mailing copies of the Environmental Assessment (EA) and cultural resource reports to tribal contacts and hosted field visits to the proposed project area. Cultural specialists and tribal elders from the Hopi, Navajo, and Ute Tribes viewed archaeological sites such as petroglyphs, pictographs, standing wall and granary structures, rockshelters, and lithic scatters identified within the project Area of Potential Effect (APE). Avoidance measures of archaeological sites documented in the project's cultural resource reports were discussed during these field visits. Existing well pads, compressor stations, and pipelines were also viewed.

No Traditional Cultural Properties (TCPs) were identified during consultation for the proposed project. Tribal representatives had the following comments and concerns.

#### *Hopi Tribe*

The Hopi Cultural Preservation Office Director consulted extensively with the BLM concerning the project EA and potential impacts to cultural resources within the project area. Consultation included written correspondence and electronic mail. The BLM also met with the Hopi Cultural Preservation Office staff on April 22, 2004 and later hosted a field visit to the project area on June 29, 2004.

Through correspondence and telephone conversations with the BLM, the Hopi asserted their claim of cultural affiliation to the inhabitants of Nine Mile Canyon known in archaeological terms as the Archaic and Fremont. Identification and avoidance of the cultural resources located within the project area was requested throughout the consultation process for this project. There was also a concern for the disturbance of subsurface burials that could be discovered during pipeline construction. In a meeting with the BLM on April 22, 2004, Hopi Cultural Preservation Officer, Leigh Kuwanwisimwa, requested that

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the BLM work towards the development of an MOU for purposes of continued collaboration and consultation concerning the identification of TCPs and related cultural resource issues. At the same meeting, a suggestion was made to the BLM to consider an alternative access route into the project area that would minimize traffic and dust within Nine Mile Canyon.

In a letter to the BLM dated June 1, 2004, Mr. Kuwanwisimwa restated the above mentioned requests and concerns and informed the BLM of their support for the No Action Alternative in the project EA noting that the EA was substantially incomplete. In an electronic email to the BLM sent on June 25, 2004, Mr. Kuwanwisimwa strongly recommended avoidance of cultural resources, specifically potential Hopi traditional sites within the project area, and again noted the Hopi Tribe's concern for the disturbance of human graves.

During a field visit to the project area on June 29, 2004, Hopi representatives suggested that a study should be done on the effects of dust to the rock art panels in Nine Mile, Cottonwood, and Dry Canyons. Hopi representatives did not identify any TCPs but requested avoidance of all prehistoric archaeological sites within the project area. A request was also made for a monitoring plan during pipeline construction.

#### *Uintah and Ouray Ute Indian Tribe*

Representatives from the Uintah and Ouray Ute Cultural Rights and Protection Program participated in two field visits (May 10 and 24, 2004) to the project area. Requests were made for the reestablishment of impacted vegetation within the project area and for additional information on the Fremont sites within Nine Mile Canyon. Representatives suggested that a study could be produced on the Fremont and the information shared with interested tribes in a forum or seminar setting. A request was made for avoidance and protection of the archaeological sites within the project area; however, no TCPs were identified.

#### *Navajo Nation*

A field visit was conducted with a representative from the Navajo Historic Preservation Office on May 26, 2004. The Navajo consider the Green River to be a TCP and a concern was voiced about the potential for water contamination and seepage into the Green River resulting from drilling activities. A request was made for immediate riparian restoration associated with the proposed pipeline replacement

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projects. Dust impacts to the petroglyphs and pictographs resulting from increased visitation to Nine Mile Canyon were also discussed but no specific requests or recommendations were made by the Navajo representative. No TCPs were identified.

*Paiute Indian Tribe of Utah*

On April 5, 2004, BLM-Price Field Office received a letter from the Paiute Cultural Resources Director, Dorena Martineau, stating that the proposed project area is part of the aboriginal Southern Paiute homelands. Additional consultation was not requested; however the tribe would like to be informed of significant changes to the EA and informed of unanticipated discoveries within the project area.

*Pueblo of Nambe*

The Nambe NAGPRA Representative requested to be contacted in the event of unanticipated discoveries of human burials within the proposed project area.

*Southern Ute Tribe*

The Southern Ute NAGPRA Representative deferred project consultation to the Uintah and Ouray Ute Indian Tribe. The NAGPRA representative was invited to participate in a joint field visit with the Uintah and Ouray Utes but did not attend.

*Kaibab Paiute Tribe*

The Kaibab Cultural Resources Director deferred project consultation to the Uintah and Ouray Ute Indian Tribe.

*Navajo Nation, Mexican Water Chapter*

The Chapter Coordinator stated that the Chapter would not request to consult on the proposed project.

Several attempts were made to contact the Pueblos of Zuni, Zia, Laguna and Navajo Chapters (Aneth, Oljato, Dennehotso) but a final response was not received from these tribal organizations.

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### **3.3.3 Floodplains**

Nine Mile Creek has a continuous well-developed floodplain. Nine Mile Creek has undergone a transition in channel type over the past century that has resulted in the present floodplain dimensions; however, the terrace above the present floodplain was the floodplain approximately 100 years ago. The entire expanse of the present floodplain and portions of the 100-year terrace are underlain by saturated shallow alluvium. Dry Canyon Creek, Cottonwood Creek, and parts of Harmon Canyon have floodplains adjacent to the creeks in some reaches and on benches in other reaches and have no floodplains in other reaches.

### **3.3.4 Threatened, Endangered, Candidate, and Sensitive Species (TESS)**

#### **3.3.4.1 Federally Listed Species**

The U.S. Fish and Wildlife Service (USFWS) identified 15 federally listed animal species and 14 federally listed plant species that may occur in or near the WTPPA (Carbon and Duchesne Counties) based on occurrence or suitable habitat. Through coordination between the USFWS, the Utah Division of Wildlife Resources (UDWR), and the BLM Price Field Office, a list of the 14 federally listed species that may potentially occur in the WTPPA was formulated (Table 3.5); this list includes nine animal species and five plant species. Informal consultation has been completed with the USFWS (Appendix G).

A brief description of these federally listed species follows.

**Black-footed Ferret (*Mustela nigripes*).** Prairie dog colonies constitute potential habitat for black-footed ferret (endangered). No prairie dog colonies occur in the WTPPA; therefore, there would be no effect to black-footed ferret, and it is not discussed further in this EA.

**Canada Lynx (*Lynx canadensis*).** In the western U.S., lynx (threatened) live in spruce/fir forests at high elevations. Suitable habitat for lynx is not present within the WTPPA; therefore, there would be no effect to Canada lynx, and it is not discussed further in this EA.

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Table 3.5 Federally Listed Animal and Plant Species Potentially Occurring in the WTPPA.

Common Name	Scientific Name	Status
<b>Mammals</b>		
Black-footed ferret	<i>Mustela nigripes</i>	Endangered/Extirpated
Canada lynx	<i>Lynx canadensis</i>	Threatened
<b>Birds</b>		
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened
Yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	Candidate
<b>Fish</b>		
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	Endangered
Humpback chub	<i>Gila cypha</i>	Endangered
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered
Bonytail chub	<i>Gila elegans</i>	Endangered
<b>Plants</b>		
Barneby ridgegrass	<i>Lepidium barnebyanum</i>	Endangered
Shrubby reed-mustard	<i>Schoenocrambe suffrutescens</i>	Candidate
Uinta Basin hookless cactus	<i>Sclerocactus glaucus</i>	Threatened
Graham beardtongue	<i>Penstemon grahamii</i>	Candidate
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	Threatened

**Bald Eagle (*Haliaeetus leucocephalus*).** No bald eagle (threatened) nests occur within the WTPPA (Colt 2003). Foraging habitat for the species does occur, and the bald eagle may occasionally roost in the WTPPA any time between November 1 and March 31.

**Mexican Spotted Owl (*Strix occidentalis lucida*).** The Mexican spotted owl (MSO) (threatened) is found in a variety of habitats ranging from southern Utah, Colorado, Arizona, New Mexico, west Texas, and central Mexico. In Utah, MSOs are found primarily in deeply entrenched canyons that have numerous cliffs and ledges. MSOs nest primarily in closed canopy forests and rocky canyons and will nest in stick nests built by other birds, on debris platforms in trees, and in tree cavities. The MSO begins courtship in March, and the first eggs are laid in early April. Females incubate the eggs for approximately 30 days. The nest is active and maintained until fall when the young owls leave the natal area. They normally feed on small nocturnal mammals, birds, bats, and arthropods. Little is known about the range of habitats used by foraging owls except that they forage over a wider range of habitats than they utilize for roosting.



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Based on the USFWS-adopted 1997 model/map and the more-recent 2000 update of the model/map, suitable habitat for MSO occurs in Cottonwood Canyon and Dry Canyon. Surveys of the designated critical habitat were conducted within or in close proximity to the WTPPA in 1997 and 2000 (personal communication, July-August 2002, with David Willey, Professor of Wildlife, Montana State University, Missoula), and all suitable habitat within the WTPPA was surveyed in 2001, 2002, and 2003 using USFWS protocol. No MSOs or MSO nests have been found. Although no MSOs or their nests were identified within the WTPPA, a MSO nest has been located approximately 18 miles to the southeast in Big Canyon, and sightings were made in Rains Canyon, approximately 22 miles southeast of the WTPPA, in 2000.

**Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*).** Western yellow-billed cuckoos (candidate) are considered a riparian obligate and are usually found in large tracts of cottonwood/willow habitats with dense sub-canopies. Nesting habitat is classified as dense lowland riparian characterized by a dense sub-canopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) within 100 meters (333 feet) of water. Overstory in these habitats may be either large, gallery-forming trees (33-90 feet) or developing trees (10-27 feet), usually cottonwoods. Nesting habitat is found at low to mid-elevations (2,500-6,000 feet) in Utah. Cuckoos generally require large tracts (100-200 acres) of contiguous riparian nesting habitat. No such habitat is found in the WTPPA; therefore, there would be no effect to the western yellow-billed cuckoo, and it is not discussed further in this EA.

**Colorado River Endangered Fish Species.** The Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), and bonytail chub (*Gila elegans*) (all endangered) inhabit the Green and Colorado River systems below Flaming Gorge Dam. Although none of these species are known to occur in the WTPPA, potential habitat does occur downstream in the Green River. Under the *Recovery and Implementation Program for Endangered Fish Species in the Upper Colorado River Basin* (RIP), any water depletions from tributary waters within the Colorado River drainage are considered to jeopardize the continued existence of these fish.

**Barneby Ridge-cress (*Lepidium barnebyanum*).** Areas suspected to contain potential habitat for Barneby ridge-cress (endangered) consist of white shale outcrops on the Uinta Formation in pinyon-juniper (mainly on ridge crests) at elevations between 6,200 and 6,500 feet. Flowering occurs from May to June. The WTPPA does not contain suitable habitat (areas of white shale outcrops and/or pinyon-

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juniper communities) for this species, and surveys in 2003 did not reveal the presence of this species in the WTPPA; therefore, it is not discussed further in this EA.

**Shrubby Reed-mustard (*Schoenocrambe suffrutescens*).** Areas suspected to contain potential habitat for shrubby reed-mustard (candidate) consist of calcareous shale of the Green River Shale Formation in shadscale, pygmy sagebrush, mountain mahogany, juniper, and other mixed desert shrub communities at elevations between 5,400 and 6,000 feet. Flowering occurs from May to mid-August. The WTPPA does not contain suitable habitat--areas of white shale outcrops and/or pinyon-juniper communities--for this species, and surveys in 2003 did not reveal its presence in the WTPPA; therefore, it is not discussed further in this EA.

**Uinta Basin Hookless Cactus (*Sclerocactus glaucus*).** The Uinta Basin hookless cactus (threatened) is found in Duchesne, Uintah, and northern Carbon Counties. It is found on gravelly hills and terraces on alluvial soils in cold shrub communities at elevations between 4,700 and 6,000 feet. They flower between May and June. UDWR has recent records of occurrence of Uinta Basin hookless cactus several miles east of the WTPPA (personal communication, February 26, 2004, with Lenora Sullivan, UDWR, Salt Lake City); however, the WTPPA does not contain gravelly hills and terraces, and surveys in 2003 did not reveal the presence of this species in the WTPPA. Therefore, it is not discussed further in this EA.

**Graham Beardtongue (*Penstemon grahamii*).** Areas suspected to contain potential habitat for Graham beardtongue (candidate) consist of sparsely vegetated desert shrub and pinyon-juniper communities on shaley talus knolls at elevations between 4,600 and 6,700 feet. Flowering occurs from May to mid-June. Surveys in 2003 did not reveal the presence of this species in the WTPPA; therefore, it is not discussed further in this EA.

**Ute Ladies'-tresses (*Spiranthes diluvialis*).** Ute ladies'-tresses (threatened) occur in Daggett, Duchesne, Garfield, Salt Lake, Tooele, Uintah, Utah, Wayne, Wasatch, and Weber Counties, Utah, as well as in the states of Colorado, Idaho, Montana, Nebraska, Nevada, Washington, and Wyoming. A member of the orchid family, this species is a perennial herb with a flowering stem 20-50 cm tall that arises from a basal rosette of grass-like leaves. The flowers are ivory-colored and arranged in a spike at the top of the stem. They bloom from late July through August. Ute ladies'-tresses is found in moist to very wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lakeshores. It grows in sandy

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or loamy soils that are typically mixed with gravels. In Utah, it ranges in elevation from 4,300 to 7,000 feet. The WTPPA does not contain suitable habitat for this species; therefore, Ute ladies'-tresses is not discussed further in this EA.

#### 3.3.4.2 BLM-Sensitive Animal Species

The BLM in Utah uses the UDWR sensitive animal species list dated February 12, 1998 (UDWR 1998; BLM Instruction Memorandum No. UT 2003-027). However, UDWR has a new sensitive animal species list dated December 18, 2003, that is in effect, although an updated BLM Instruction Memorandum has not yet been issued. State-sensitive species include any wildlife species or subspecies that has experienced a substantial decrease in population, distribution, and/or habitat availability (SP); occurs in limited areas and/or numbers due to restricted or specialized habitat (SD); or has both a declining population and a limited range (SP/SD).

BLM-sensitive animal species that may occur in the WTPPA are included in Table 3.6 (personal communication, February 26, 2004, with Lenora Sullivan, UDWR, Salt Lake City; BLM Instruction Memorandum No. UT 2001-081; Utah BLM State-Sensitive Plant and Animal Species List; and BLM Price Field Office files). The UDWR has recent records of occurrence for bluehead sucker, flannelmouth sucker, greater sage-grouse, and roundtail chub within the WTPPA (personal communication, February 26, 2004, with Lenora Sullivan, UDWR, Salt Lake City). Ringtail cat and greater sage-grouse were observed in the WTPPA during field surveys conducted in 2002 (EIS Environmental & Engineering Consulting 2002).

There are no known leks or nesting habitat for greater sage-grouse in the WTPPA; however, UDWR has identified high-value winter range and high-value yearlong range in the area.

#### 3.3.4.3 BLM-Sensitive Plant Species

The State of Utah does not have sensitive plant list; however, the BLM Utah State Office lists three sensitive species that potentially occur in Carbon County, Utah (Table 3.7) (Instruction Memorandum No. UT 2003-027). Portions of the WTPPA include suitable habitat (i.e., sagebrush and pinyon-juniper) for the Book Cliffs blazing star (*Mentzelia multicaulis librina*), but no observations of this species were

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Table 3.6 Utah-Sensitive Animal Species Potentially Occurring in the WTPPA.

Common Name	Observed During 2002 Surveys	Status <sup>2</sup>
<b>Mammals</b>		
Spotted bat	No	SP
Brazilian free tailed bat <sup>1</sup>	No	SP/SD
Big free tailed bat	No	SP/SD
Northern flying squirrel <sup>1</sup>	No	SD
Ringtail cat <sup>1</sup>	Yes	SD
<b>Reptiles</b>		
Utah milk snake <sup>1</sup>	No	SP
Great Plains rat snake <sup>1</sup>	No	SP/SD
<b>Birds</b>		
Swainson's hawk <sup>1</sup>	No	SP
Greater sage-grouse	Yes	SP/SD
Black swift	No	SP/SD
Lewis woodpecker	No	SP/SD
Crissal thrasher <sup>1</sup>	No	SP/SD
Bells vireo <sup>1</sup>	No	SP/SD
Common yellowthroat <sup>1</sup>	No	SP
Blue grosbeak <sup>1</sup>	No	SP/SD
Loggerhead shrike <sup>1</sup>	No	--
Burrowing owl	No	SP

<sup>1</sup> These species are no longer considered sensitive species (as of 12/03) by UDWR.

<sup>2</sup> SP = species that has experienced a substantial decrease in population, distribution, and/or habitat availability.

SD = species occurring in limited areas and/or numbers due to restricted or specialized habitat.

SP/SD = species with both a declining population and a limited range.

Table 3.7 BLM-Sensitive Plant Species Potentially Occurring in the WTPPA.

Common Name	Scientific Name	Habitat <sup>1</sup>	Potential Occurrence
Creutzfeldt-flower	<i>Cryptantha creutzfeldtii</i>	Shadscale and mat <i>Atriplex</i> communities on the Manco Shale Formation; 5,250- to 6,495-foot elevation	Unlikely; no suitable habitat
Book Cliffs blazing star	<i>Mentzelia multicaulis librina</i>	Sagebrush, rabbitbrush, and pinyon-juniper communities; 6,200-foot elevation; on Manco Shale and Price River Formations	Likely; suitable habitat
Utah phacelia	<i>Phacelia utahensis</i>	Salt desert shrub community on the Arpapien Shale Formation; 5,500- to 5,700-foot elevation	Unlikely; no suitable habitat

<sup>1</sup> Based on Atwood et al. (1991).

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recorded during the 2001 threatened and endangered (T&E) and sensitive species surveys (EIS Environmental & Engineering Consulting 2002).

#### 3.3.4.4 Migratory Birds

Avian populations, particularly neotropical migratory birds (NTMBs) have declined in North America and several other portions of the Western Hemisphere. The reasons for the decline include loss of breeding habitat due to fragmentation, alteration, urban expansion, and natural disasters; loss or alteration of habitat in non-breeding areas and along migratory routes; and brood parasites (Parish et al. 2002). In 1989, Partners in Flight (PIF) began a coordinated effort to document and address the status of avian populations in North America (Table 3.8) and to establish state or regional Conservation Planning Units to develop Bird Conservation Plans. These plans would identify priority species in need of conservation action.

Utah PIF was organized in 1993 for the purpose of addressing the status of avian populations within the state and to provide data relevant to issues raised concerning the status of NTMBs in the Western Hemisphere. In 2001, Presidential Executive Order 13186 was signed. The Executive Order directs federal agencies to take certain actions to further protect “species of concern” migratory birds and their habitats under the *Migratory Bird Treaty Act* (MBTA). The Executive Order refers to species of concern as species listed in *Migratory Nongame Birds of Management Concern* and priority migratory bird species as documented by established plans such as Bird Conservation Regions in the North American Bird Conservation Initiative or PIF physiographic areas, and those listed in 50 C.F.R. 17.11.

The Utah PIF Avian Conservation Strategy (Parrish et al. 2002), which incorporates 1995 USFWS species as well as those listed in 50 *Code of Federal Regulations* (C.F.R.) 17.11, currently identifies 33 species in Utah as priority species--species that are experiencing a decline in populations and/or habitats. Of these, 24 Utah PIF priority species have been prioritized for conservation efforts.

The WTPPA is located in the Colorado Plateau physiographic region of Utah (Parrish et al. 2002) and is composed primarily of high desert scrub, shrubsteppe, pinyon-juniper woodlands, and ponderosa pine habitat types. Riparian communities occur along the Dry Canyon, Cottonwood Canyon, and Nine Mile Creek drainages and are recognized as high-density migratory bird habitats by BLM. Based on

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Table 3.8 Utah Partners in Flight Priority Species and Potential Occurrence.

Common Name <sup>1</sup>	1° Breeding Habitat <sup>2</sup>	2° Breeding Habitat <sup>3</sup>	Wintering Habitat <sup>4</sup>	Potential Occurrence <sup>5</sup>
Lewis's Woodpecker	Ponderosa Pine	Lowland Riparian	Oak	Yes
Albert's Towhee	Lowland Riparian	Lowland Riparian	Lowland Riparian	No
American Avocet	Wetland	Playa	Migrant	No
Le Conte's Thrasher	Low Desert Scrub	Low Desert Scrub	Low Desert Scrub	No
Mountain Plover	High Desert Scrub	High Desert Scrub	Migrant	Yes
Lucy's Warbler	Lowland Riparian	Low Desert Scrub	Migrant	Yes
Greater Sage-Grouse <sup>6</sup>	Shrubsteppe	Shrubsteppe	Shrubsteppe	Yes
American White Pelican	Water	Wetland	Migrant	No
Bobolink	Wet Meadow	Agriculture	Migrant	No
Virginia's Warbler	Oak	Pinyon-Juniper	Migrant	Yes
Gray Vireo	Pinyon Juniper	Oak	Migrant	Yes
Bell's Vireo	Lowland Riparian	Lowland Riparian	Migrant	No
Black Rosy-Finch	Alpine	Alpine	Grassland	No
Long-Billed Curlew	Grassland	Agriculture	Migrant	No
Sharp-tailed Grouse	Shrubsteppe	Grassland	Shrubsteppe	No
Brewer's Sparrow	Shrubsteppe	High Desert Scrub	Migrant	Yes
Black Swift	Lowland Riparian	Cliff	Migrant	No
Black-necked Stilt	Wetland	Playa	Migrant	No
Broad-tailed Hummingbird	Lowland Riparian	Mountain Riparian	Migrant	Yes
Ferruginous Hawk	Pinyon-Juniper	Shrubsteppe	Grassland	Yes
Brown-crested Flycatcher	Lowland Riparian	Low Desert Scrub	Migrant	No
Bendire's Thrasher	Low Desert Scrub	Low Desert Scrub	Migrant	No
Black-tailed Gnatcatcher	Low Desert Scrub	Lowland Riparian	Low Desert Scrub	No
Common Black-Hawk	Lowland Riparian	Lowland Riparian	Migrant	No
Yellow-billed Cuckoo <sup>7</sup>	Lowland Riparian	Agriculture	Migrant	Yes
Black-throated Gray Warbler	Pinyon-Juniper	Lowland Riparian	Migrant	Yes
Grasshopper Sparrow	Grassland	Grassland	Migrant	No
Three-toed Woodpecker	Sub-Alpine Conifer	Lodgepole Pine	Sub-Alpine Conifer	No
Sage Sparrow	Shrubsteppe	High Desert Scrub	Low Desert Scrub	Yes
Gambel's Quail	Low Desert Scrub	Lowland Riparian	Low Desert Scrub	No
Cordilleran Flycatcher	Sub-Alpine Conifer	Mountain Riparian	Migrant	No
Gray Flycatcher	Pinyon-Juniper	High Desert Scrub	Migrant	Yes
Mexican Spotted Owl <sup>7</sup>	Cliff	Lowland Riparian	Cliff	Yes

<sup>1</sup> Utah Partners in Flight species for conservation action appear in bold type.

<sup>2</sup> 1° Breeding Habitat: Primary habitat used during the breeding season in Utah (nesting habitat).

<sup>3</sup> 2° Breeding Habitat: Secondary habitat used during the breeding season in Utah (nesting or foraging habitat; habitat specialists may have identical 1° and 2° habitats).

<sup>4</sup> Winter Habitat: primary winter habitat in Utah.

<sup>5</sup> Potential occurrence based on physiographic region (i.e., Colorado Plateau) and habitat present in or in the vicinity of the project area

<sup>6</sup> Greater sage-grouse are addressed in Section 3.3.9.

<sup>7</sup> These species are addressed in Threatened and Endangered Species Section 3.3.4.1 and in the Biological Assessment for the project.

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physiographic location and habitat preference, 13 Utah PIF high priority species may utilized high desert scrub, shrubsteppe, lowland riparian, ponderosa pine, and pinyon-juniper woodlands areas as primary and secondary habitat used during the breeding season (Table 3.8). All of these species migrate from the WTPPA after breeding, with the exception of the greater sage-grouse that utilizes the shrubsteppe as wintering habitat.

### **3.3.5 Water Quality**

Ground water resources in the WTPPA are contained in non-regional alluvial aquifers within the canyons that dissect the West Tavaputs Plateau, as well as in small, isolated, and perched aquifers in the upper member of the Green River Formation that caps the upland surface of the plateau. Although the upper and middle members of the Green River Formation are aquitards, some ground water accumulations in the upper and middle members are evidenced by the presence of numerous springs and stock wells. Based on National Weather Station data from Price, the area is in the eighth consecutive year of below-normal precipitation. The drought has reduced water tables and flows in many streams, springs, and seeps. Ground water flow is down-gradient within the alluvial canyon bottoms and down dip, mostly north, where flow is possible within the mostly consolidated upper Green River member. The occurrence of springs in the WTPPA coincides with the exposure of a more porous sandstone lens that overlies a tighter less-permeable silt stone or claystone/mudstone lithology or with a coalescence of a network of subsurface cracks in the tighter rocks where water has entered the crack system that has inlets on the surface to receive runoff from precipitation. Spring and well yield data for eight wells in the area range up to 0.0220 cubic feet per second (cfs). Five of the eight wells were identified as being used for stock water. No information on water quality of these wells is available; however, the designation of use for stock water provides an indication that the quality is at least suitable for that purpose.

Water quality in the alluvial aquifers is likely consistent with the corresponding surface water flows in the overlying stream channels (Price 1984) with one known exception. A well drilled next to Nine Mile Creek in Section 12, T12S, R13E, in 1997 revealed the presence of a sub-alluvial confined aquifer that has approximately 30 percent lower specific conductivity (salinity) than the surface water in the creek or in the channel alluvium. The channel alluvium at the well location is continuous from a depth of 22 feet below the surface of the 100-year terrace (the depth of channel incision at this location) to approximately 57 feet. A confining clay layer exists from 57 to 76 feet, beneath which lies another water-bearing sandstone. Little more is known about the structure, extent, or hydrologic characteristics of this lower

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aquifer at present. It is likely the lower aquifer is similar in quality to surface and alluvial waters throughout the project area. Nine Mile Creek differs in quality due to agricultural influence. U.S. Geological Survey (USGS) water quality information for a sampling point on Nine Mile Creek just above Gate Canyon indicates Nine Mile Creek's total dissolved solids content ranges from 250 to 1,000 milligrams per liter (mg/l). This falls within the range deemed suitable for stock watering. Additionally, Nine Mile Creek is on the State of Utah *Clean Water Act* 303(d) list of impaired waters due to high temperatures.

The majority of the WTPPA is within the lower portion of the Nine Mile Creek watershed along the south side of the creek, encompassing several tributary canyons from Nine Mile Creek to their headwaters. The major drainages include Harmon, Prickly Pear, Cottonwood, and Dry Canyons. These drainages have a variety of flow regimes depending upon elevation and geology; however, Cottonwood Canyon Creek, Dry Canyon Creek, and, to a lesser extent, Harmon Canyon Creek are best classed as "interrupted perennial" effluent (spring-fed) streams. Long stretches of channel in all of these canyons exhibit intermittent seasonal flows, whereas other reaches have surface flows only in response to precipitation events. Surface flows are evident in the upper reaches of Cottonwood and Dry Canyons (where bedrock is encountered) for all or most of the year during normal years, as well as in the a few locations along the middle segments. Surface flows occur during most or all of normal years in the lower reaches where each canyon joins with Nine Mile Creek. Irrespective of surface flow regime, each canyon drainage has subsurface hydrologic connectivity. For this reason, these drainages are considered continuously perennial.

Water quality in both Dry and Cottonwood Canyons is good, being suitable for all designated beneficial uses.

The remainder of the WTPPA is within watersheds that are direct tributaries to the Green River, the majority being within the Jack Creek watershed. Jack Creek is predominantly intermittent; however, the upper reaches contain perennial springs within the channel during normal water years. Water quality in both Jack Creek and the Green River is good, meeting all designated beneficial use criteria.

The proposed Nine Mile Creek crossing location is presently in poor condition. The banks have been disturbed, and the bottom of the creek is frequently churned by crossing vehicles, resulting in channel instability in the immediate vicinity and excess silt-loading of the creek water. The crossing requires

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frequent maintenance involving filling the channel bottom with bladed road fill, a process that adds additional sediment to the creek.

The shape of the Dry Canyon channel prohibits a low-water-crossing design because of the instability that grading the channel banks would produce and because of the difficulty in achieving future reclamation. Therefore, the combination culvert-high flow crossing design is proposed for the Dry Canyon crossing.

The maximum water use of 3,000 bbl/day necessary for operations that is described in the Proposed Action is approximately equal to 0.4 acre-feet/day or 0.2 cfs, which probably approximates the base flow at the mouth of Dry Canyon during normal years.

Due to land management changes, some of which are already being implemented, Nine Mile Creek is likely going to aggrade in many areas, which will raise the local water table, increase the dimensions of the riparian zone, etc. Most importantly, beaver dams will create ponds and wetlands.

### **3.3.6 Wetlands/Riparian Zones**

Stream bottoms in the nearly level to gently sloping canyon bottoms support the riparian areas in the WTPPA. The majority of the riparian areas are within 330 feet of the stream channels. Riparian vegetation along streams with short perennial reaches includes tamarisk (*Tamarix ramosissima*), Fremont cottonwood (*Populus fremontii*), boxelder (*Acer negundo*), Woods rose (*Rosa woodsii*), skunkbrush (*Rhus aromatica*), common reed (*Phragmites australis*), and rubber rabbitbrush (*Chrysothamnus nauseosus*). Where there are reliable sources of water (e.g., springs and seeps), rushes, sedges, and willows occur. Some of the vegetation present in the riparian areas consists of species such as tamarisk and common reed that are generally considered to be of low quality as compared to willows and cottonwoods.

Nine Mile Creek contains active beaver dams that have created ponds and associated wetlands within the canyon. Based on surface geomorphology, riparian vegetation extends between terrace walls within the incised segment of Nine Mile Creek.

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However, few wetlands occur in the WTPPA because of the relative lack of surface water and precipitation. No surveys have been conducted to delineate specific wetlands or to determine if such wetlands are jurisdictional according to the U.S. Army Corps of Engineers (Corps) definition (Corps 1987), the same definition as used in Executive Order 11990. Any wetlands that do occur in the WTPPA would be along streams or small areas around springs or seeps.

### **3.3.7 Wild and Scenic Rivers**

The *Wild and Scenic Rivers Act* (Public Law 90-542) is designed to preserve free-flowing rivers with outstandingly remarkable values (ORVs) in their natural condition for the benefit of present and future generations, balancing the nation's water resource development policies with river conservation and recreation goals. The evaluation of rivers for potential designation into the National Wild and Scenic Rivers System is a three-step process: determining 1) a river's eligibility, 2) tentative classification, and 3) suitability for designation. Eligibility and tentative classification consists of an inventory of existing conditions and evaluates whether a river or river segment is free-flowing and possesses one or more ORVs. If a river is found eligible, it is analyzed as to its current level of development (water resources projects, shoreline development, accessibility) and segmented accordingly. Each river segment is given one of three tentative classifications--wild, scenic, or recreational--based on the degree of development. The final procedural step, suitability, provides the basis for determining whether to recommend the river or river segment as part of the national system.

No designated wild or scenic rivers are present in the WTPPA; however, a 45-mile long segment of Nine Mile Creek, which flows through the WTPPA, is eligible for designation with a tentative classification of recreational. Although there are diversion works on Nine Mile Creek, such minor structures do not automatically bar it from consideration as eligible. In this case, Nine Mile Creek maintains a riverine character and therefore was determined to be free-flowing. The recreational classification, the least restrictive of the three classifications, is given to rivers readily accessible by road or railroad that may have some development along their shorelines and may have substantial evidence of human activity. The ORVs that make Nine Mile Creek eligible for designation as a recreational river are its outstandingly remarkable cultural, historical, and scenic values. Nine Mile Canyon has the greatest concentration of prehistoric rock art in the world. The river area, informally referred to as "the world's longest art gallery," is at least nationally significant for its concentration of prehistoric rock art and evidence of Native American habitation. It is one of the best examples of Non-City of Zion settlement, an unusual

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pattern in Utah, and values include sites associated with community development and decline, fur trade and exploration, arming/ranching, military history, communication, transportation, irrigation, and Civilian Conservation Corps. Scenic values include the dramatic topography of high canyon walls dissected by steep side canyons and punctuated with isolated buttes, mesas, and outcrops. A series of farms and ranches provide a rural appearance to an otherwise dramatic western landscape.

### **3.3.8 Vegetation**

The areas impacted by the WTPDP consist primarily of pinyon-juniper vegetation type that is a common vegetation type that covers millions of acres throughout Utah and the western United States. The dominant plants within this plant community are pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Common shrubs in this community consist of big sagebrush (*Artemisia tridentata*) and rubber rabbitbrush (*Chrysothamnus nauseosus*). Grass species include Indian ricegrass (*Oryzopsis hymenoides*), salina wildrye (*Elymus salinas*), needle-and-thread grass (*Stipa comata*), blue grama (*Bouteloua gracilis*), and *Agropyron* species. Sagebrush/grass associations are found on flat benches and along ridgelines. Nine Mile Canyon includes sagebrush/grass, rabbitbrush, greasewood (*Sarcobatus vermiculatus*), and cheatgrass (*Bromus tectorum*) as well as irrigated pasture lands. The riparian areas include willows, tamarisk, cottonwood, common reed, and other species (see Section 3.3.6).

### **3.3.9 Wildlife Resources**

The pinyon-juniper, sagebrush-grass, and canyon habitats in the general area support a variety of big game, upland game, small game, and non-game wildlife species. Species of management concern include mule deer, elk, Rocky Mountain bighorn sheep, mountain lion, greater sage-grouse, and a variety of raptor species including golden eagle, red-tail hawk, prairie falcon, and peregrine falcon. Even though some canyon roads in the WTPPA are occasionally cleared and maintained by BBC to access existing gas wells, the general public often finds the roads impassable from December to March.

Because the upper canyons and plateaus surrounding Nine Mile Canyon are remote and snow is not consistently removed from the roads, the wildlife habitat in these portions of the WTPPA is highly protected from human intrusion during the winter months. The WTPPA is in the Range Creek Herd Unit and includes critical and high-priority range for elk (Figure 3.2) and critical, high-value, and substantial-

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value range for mule deer (Figure 3.3). For elk, the four units include 2,651 acres of critical spring and fall range, 104 acres of critical summer range, 27,263 acres of critical winter range, 5,765 acres of high-value summer range, and 6,384 acres of high value winter range. For mule deer, the four units include 4,421 acres of critical spring and fall range, 451 acres of critical summer range, 33,555 acres of high-value winter range, and 5,412 acres of substantial-value year-long range. Nine Mile Canyon and lower Dry Canyon provide critical spring/fall habitat for mule deer and high value winter habitat for elk. Both mule deer and elk occupy the area throughout year but use it more extensively during the winter months. Mule deer populations are currently at extremely low levels, and the decline in the deer herd may be in response to six consecutive years of drought; however, elk populations exceed UDWR management objectives or targets.

Mountain lions utilize the area during winter months as they follow prey species through their seasonal migration.

The portion of the WTPPA included in the four units includes 18,099 acres of high-value winter habitat and 771 acres of high-value yearlong habitat for greater sage-grouse (Figure 3.4). Such habitat does not occur in the canyons. Population densities are thought to be low to moderate in this general area. No leks (strutting grounds) have been identified in the WTPPA.

Cliff nesting raptor habitat is present along the rims that form the edge of the benches and along the broken rims in the canyons that branch out from the plateau. A UDWR helicopter inventory in 2002 and a ground survey by EIS Environmental & Engineering Consulting in 2002 of historic nesting sites found no active nesting sites. On May 30, 2003, UDWR conducted a follow-up survey with similar findings. Additional surveys will be completed annually as long as disturbance is likely to occur during the raptor nesting season.

### **3.3.10 Soils**

The dominant soils in the WTPPA are shallow and overlies sandstone and shale bedrock. The most frequently encountered soil map unit is the Podo-Cabba family complex (M.U. 83) as identified in the *Soil Survey of Carbon County Area, Utah* (Jensen and Borchert 1988). The Podo soils are typically over sandstone and the Cabba soils over shale. Both are well drained, have moderately rapid to moderate

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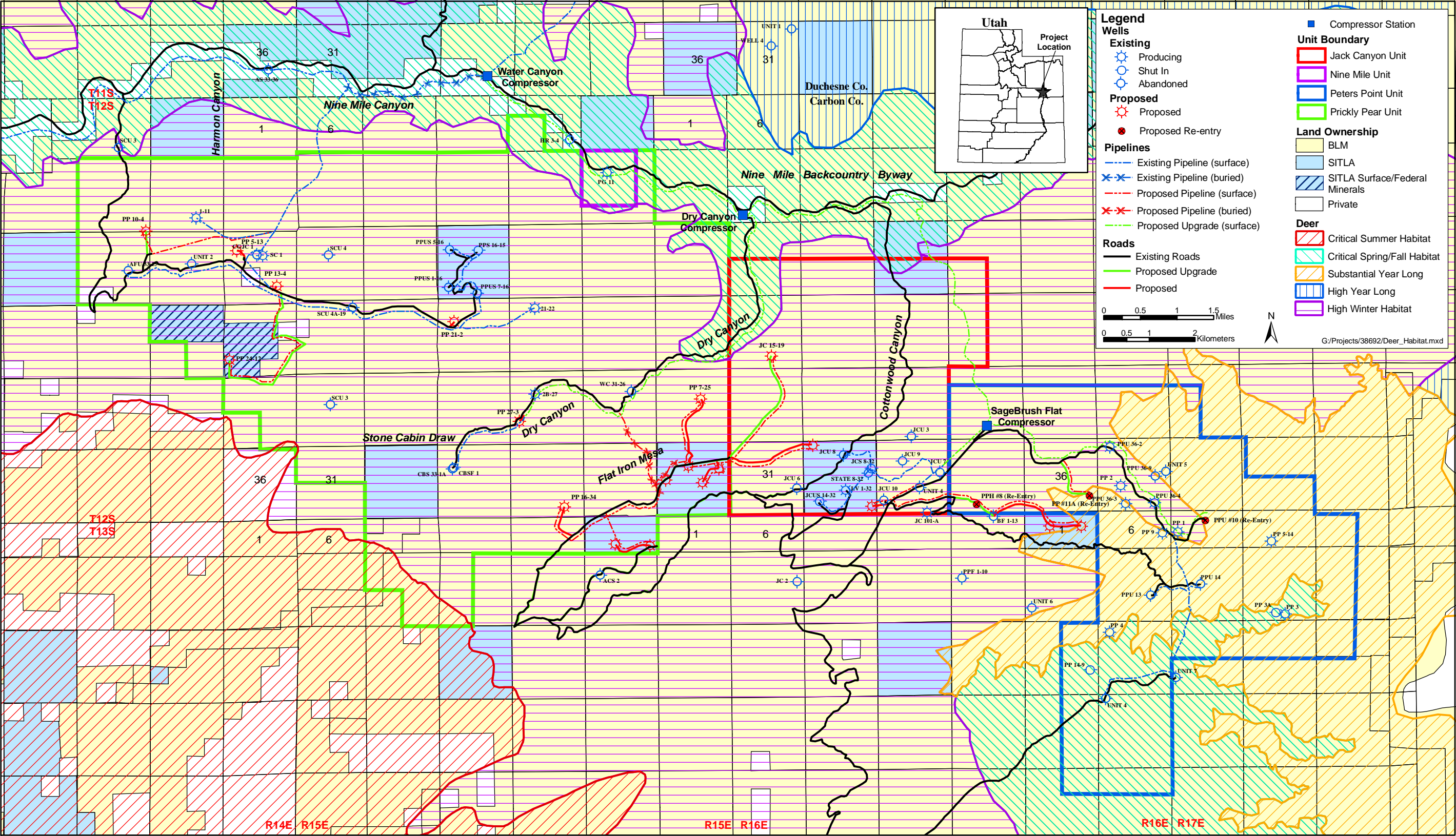


Figure 3.3 Mule Deer Habitat Designations.



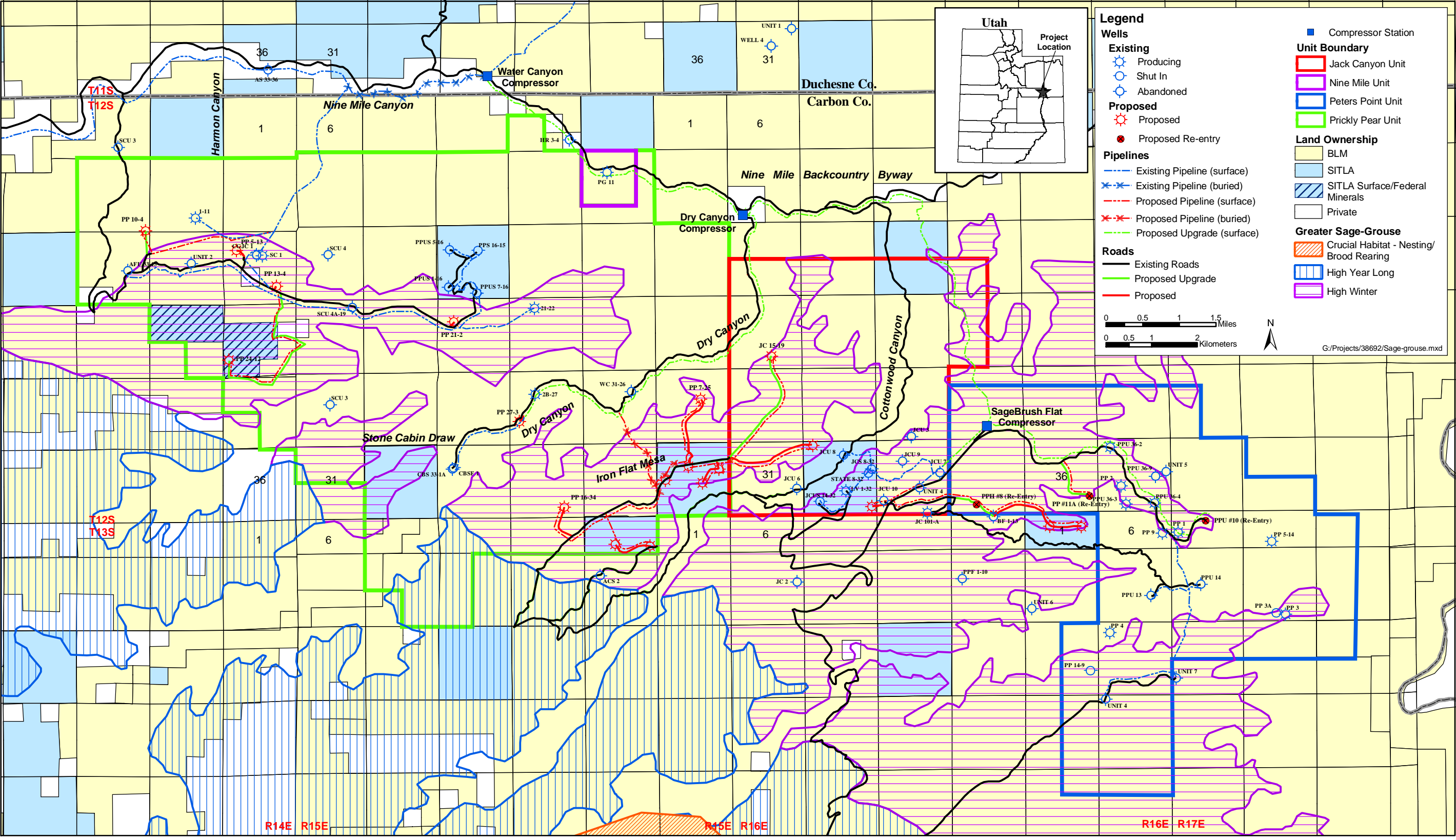


Figure 3.4 Greater Sage-Grouse Habitat Designations.

permeability, and have a moderate potential for erosion by water. Soil textures are sandy loam and loam with 10-25 percent rock fragments. Depth to bedrock is 8-20 inches, and vegetation is generally a pinyon-juniper type. Slopes are 3-30 percent.

Several sagebrush and grass openings along the ridge southwest of Flat Iron Mesa have the deeper soils of the Haverdad soil series (M.U. 50). These soils would be encountered on about 30 percent of the WTPPA and have moderate permeability and a moderate soil erosion hazard rating. Soil colors are brown to pale brown.

The 27-3 well site in Dry Canyon would be in the Shupert-Winetti complex (M.U. 107). These are deep and very deep alluvial soils formed from sandstone and shale sediments along the canyon bottom. The Winetti soils are higher in rock fragment content than the Shupert soils and are gravelly rather than loamy. The soils are well drained and support a variety of species including sagebrush, rabbitbrush, grasses, and cottonwood. The erosion hazard of the soils is slight to moderate, although this unit is subject to flooding during prolonged high-intensity storms, which may contribute to channeling and deposition.

The proposed segment of pipeline that would drop down the steep slope from the plateau to the bottom of Dry Canyon would be on Cabba and Guben soils with inclusions of rock outcrop (M.U. 13). The area includes soils that are shallow over shale, as well as deeper soils that are composed of stony colluvium derived from sandstone. Erosion hazard is high on the steep slopes, which have a gradient of 40-75 percent.

Drill sites PP 13-4 and 13-5 are mapped as having Doney soils (M.U. 25). These soils are moderately deep, well-drained, and loamy over shale bedrock. Drill site PP 12-24 is within an area mapped as having Beje soils (M.U. 5). These are shallow, well-drained, sandy loam to very gravelly sandy loam soils over sandstone bedrock. The Water Canyon compressor site is on deep, well-drained alluvial soils. Topsoil is generally 6 inches or less in depth over most of the WTPPA. On sites with deeper topsoil, identified by the lack of pinyon-juniper and more prevalent sagebrush and grasses, there may be up to 24 inches of suitable topsoil material (M.U. 50 and 107).

Biological soil crusts occur in undisturbed areas in the pinyon-juniper and sagebrush/grasslands types. It is estimated that soil crusts occur in approximately 30 percent of the WTPPA.

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Lamm (2003) conducted a geologic investigation of valley fill sediments along a portion of Nine Mile Canyon. (The primary purpose of the study was to determine the potential of encountering buried cultural resources during construction of a gas pipeline along the length of the canyon floor.) Nine Mile Creek flows incised within the alluvial valley fill. Three major types of unconsolidated deposits occur: slope failure deposits, alluvial fan deposits, and alluvial valley fill deposits. Slope failure deposits result from the forces of gravity that result in rockfall deposits, rock avalanche deposits, talus slopes, and debris fans and are often large rock fragments. Alluvial fan deposits are sediments transported by high-energy surface runoff and are located at the mouths of drainages tributary to Nine Mile Canyon. They are characterized by sandstone boulders, cobbles, and pebbles in a matrix of poorly sorted sand and silt. Alluvial valley fan deposits are primarily fine-grained sands and silts and generally extend across the canyon as a broad uniform surface.

Past reclamation in the WTPPA and vicinity has been successful even though the reclamation potential of soils is less than desirable. Table 3.9 identifies the reclamation potential for soils in the WTPPA.

### **3.3.11 Recreation**

Recreation in Nine Mile Canyon and the lower sections of the tributary canyons are managed as per the SRCMA. Most of the SRCMA area, including Nine Mile Canyon in the project area, is classified as

Table 3.9 Reclamation Potential.<sup>1</sup>

Soil types	Project Components	Reclamation Potential	Erosion Potential
Podo-Cabba	Wells, roads, pipelines	Poor	Moderate
Haverdad	Wells, roads, pipelines	Good	Moderate
Shupert-Winetti	Wells, roads, pipelines	Poor to good	Slight to moderate
Guben	Pipelines	Poor	Severe
Doney	Wells, roads, pipelines	Poor to good	Severe
Beje	Wells, roads, pipelines	Poor	Moderate

<sup>1</sup> From Jensen and Borchert (1988).

Roaded Natural under the Recreation Opportunity Spectrum (ROS). Nine Mile Canyon is managed for specific recreation experiences and activities. These include driving for pleasure, viewing cultural sites in their natural landscape context, heritage tourism, and watchable wildlife. There is an interpretive plan for the SRCMA that as yet to be implemented.

Visitation inventories have not been conducted since 1995. Visitation occurs year-round. Peak visitation is on the weekends from the spring through fall. In 1995, it was common for upwards of three hundred visitors to be in the canyon on a weekend day in the spring and summer. Nine Mile Canyon generates more requests for information from the Castle Country Regional Information Center and the Carbon County Travel Bureau than any other attraction site in the region.

Reports from visitors often reveal a less-than-satisfying experience. This is due to the unmet expectations for facilities, especially interpretive information in the canyon, and the excessive dust and poor road conditions that are often encountered. However, oil and gas exploration has not appeared to have had any effect on the number of recreational visits to Nine Mile Canyon.

At present, there are three developed recreational facilities in the SRCMA area. Nine Mile Ranch is a private campground/bed and breakfast facility. Cottonwood Glen is a day-use picnic area with a covered pavilion, table, parking area, and toilet. Daddy Canyon consists of a toilet and parking area. Of these three, only Daddy Canyon is located within the project area.

Lands on the plateau are generally outside the SRCMA area. These lands are classified as semi-primitive-motorized and semi-primitive-nonmotorized on the ROS. Recreation use is managed at the opportunity level rather than for specific experiences and activities. Most common activities on the plateau are associated with wildlife viewing and hunting. Off-highway vehicle use is becoming more popular on the plateau.

The wind and traffic on local roads are the primary sources of noise during much of the year in the WTPPA. The A-weighted sound pressure level, or A-scale, is used extensively in the U.S. for the measurement of community and transportation noise and is a measure of noise in A-weighted decibels (dBA) that is directly correlated with some commonly heard sounds (Table 3.10). Noise-sensitive receptors within and adjacent to the WTPPA include recreationists, nesting raptors, and big game animals on winter ranges.

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Table 3.10 Comparison of Measured Noise Levels with Commonly Heard Sounds.<sup>1</sup>

Source	dBA	Description
Normal breathing	10	Barely audible
Rustling leaves	20	
Soft whisper (at 16 feet [5 m])	30	Very quiet
Library	40	
Quiet office	50	Quiet
Normal conversation (at 3 feet [1 m])	60	
Busy traffic	70	
Noisy office with machines; factory	80	
Heavy truck (at 49 feet [15 m])	90	Constant exposure endangers hearing

<sup>1</sup> Tipler (1991).

The only ambient noise level measured in the WTPPA was taken in March 2004 in Nine Mile Canyon in close proximity to Nine Mile Creek. That noise level was measured at 52.6 dBA, the equivalent to a quiet office setting. No ambient noise measurements have been made in other portions of the WTPPA. However, noise in the WTPPA is likely in the range reported for “farm in valley” sites by Wyle Laboratories (1971) for Environmental Protection Agency (EPA). Median noise levels for these sites ranged from 29 to 39 dBA, depending on the time of day. Background noise levels at locations similar to the WTPPA have been predicted to be as high as 40 dBA due to traffic and wind conditions (BLM 1995b). High winds can raise noise levels to 50-60 dBA on occasion.

Noise levels in the vicinity of the Dry Canyon and Water Canyon compressor sites were measured in March 2004. Noise levels ranged from near 90 dBA 10 feet from the compressor to approximately background levels at about 600 feet (Table 3.11).

The gravel road in Nine Mile Canyon--known as County Road (CR) 53, Nine Mile Canyon Road, or Nine Mile Backcountry Byway (Byway)--would provide the primary access into Nine Mile Canyon and the identified side canyons and up into the Project Area (Figure 1.1). The Byway connects U.S. Highway 191/6 at Wellington, Utah, and U.S. Highway 191/40 at Myton, Utah. Utah Department of Transportation (UDOT) and Castle Country Travel Region Office indicate that this all season/all weather

Table 3.11 Noise Levels at Various Distances from Water Canyon and Dry Canyon Compressor Sites, March 2004.

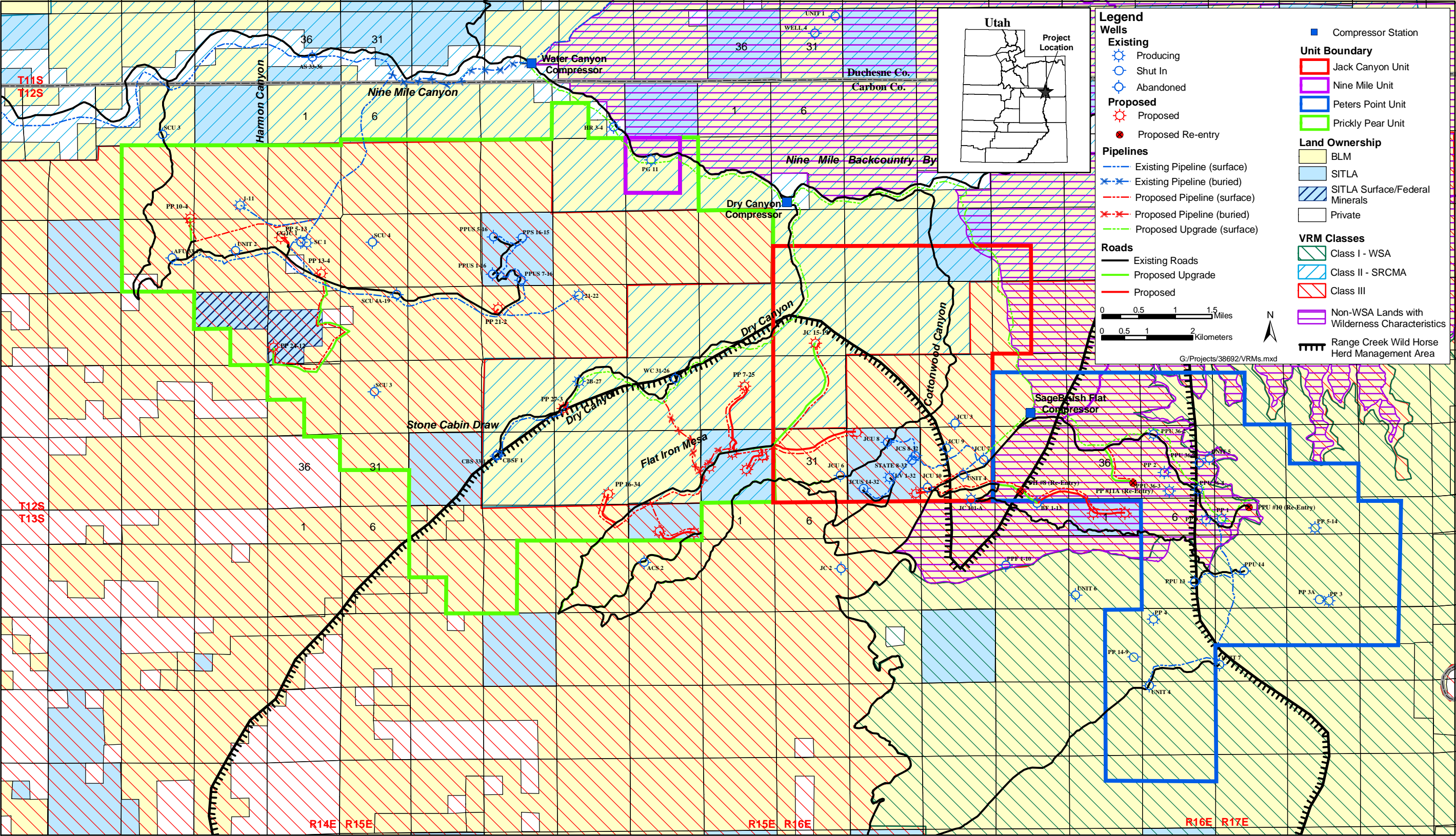
Distance from Compressor (feet)	Noise Level (dBA)	
	Water Canyon	Dry Canyon <sup>1</sup>
10	89.2	87.9
100	73.2	75.8
200	69.4	64.4
300	59.0	52.1
400	51.4	52.6
500	53.0	NM
600	51.3	52.2
700	50.1	NM
800	50.7	NM
900	51.0	NM
1,000	50.6	50.7

<sup>1</sup> NM = not measured.

road had an annual average daily traffic of 252 vehicles, or 126 round trips, in 2000. Currently, projected daily traffic for spring through fall 2004 is estimated to be higher due to the increased number of heavy vehicles and logging trucks using the road between late spring and late fall. Though access along the Byway may be precarious (muddy or slick) during inclement weather and extremely dusty during dry months, all season use is supported by regular county maintenance.

### **3.3.12 Visual Resources**

The BLM has applied Visual Resource Management (VRM) on the lands under their management throughout the WTPPA, with the overall objective being to minimize impacts resulting from human activities (Figure 3.5). The VRM inventory process considers the scenic quality of the landscape, the sensitivity of the viewer, and the distance from the viewer to the landscape.



The WTPPA includes areas designated as VRM Class II and Class III by the BLM. Portions of existing and proposed oil and gas development lie within each of these designations. VRM Class II and Class III designations are defined as follows (BLM Handbook H-8410-1 *Visual Resource Inventory*).

VRM Class II. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but must not draw the attention of the casual observer.

VRM Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer.

The landscape visual resources within the WTPPA are described by identifying forms, lines, colors, and textures that are characteristic of the region and are the primary elements making up how the landscape is perceived. Scale and spatial definition are discussed, as well as human use and influence.

The characteristic forms within the WTPPA consist of a network of plateaus, ridges, and rugged canyons that divide the landscape. Bands of red rock cliffs are ubiquitous throughout and extend along the majority of the ridges. Many ridges extend downward off the plateaus, creating a sequence and layering of ridges that add much visual variety and spatial definition to the project area. Cliffs are often broken up and of varying heights. Many boulders have cascaded down the ridges after breaking off the face, leaving the lower canyon walls peppered with scattered boulders of various sizes. Forms of vegetation in the WTPPA consist of clumps of pinyon pines, junipers, and firs, intermixed with sagebrush and grasses on the upper ridges and plateaus. These plant groupings are scattered across the tops of the plateaus and transition into more sagebrush/grasses on the ridge faces that descend to the canyon floors. The canyon floors consist primarily of sagebrush, rabbitbrush, greasewood, and grasses with groupings of aspens, cottonwoods, willows, tamarisks, and associated riparian species.

Many prominent lines occur repeatedly throughout the WTPPA, including strong silhouettes of ridgelines against the sky, diffuse edges where vegetative cover transitions from species to species, meandering drainages, roadways, pipelines, and fences, as well as edges where rock faces protrude from sloped areas covered with vegetation. Many cliff faces have definitive structure evidenced through a pattern of horizontal and vertical lines created by cracks and fissures in the rock.

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Color of the cliff faces remains constant throughout the seasons with some variations occurring on less steeply sloped and vegetated faces. These sloped areas change from winter snow-cover to early fall tans, ochres, and browns in the grassland, greens in the juniper and pine stands, light green and grays in the sage and greasewood, and yellows of the aspen and cottonwood.

Texture of the characteristic landscape includes rock faces and exposed landform that ranges from fine, and medium to coarse grain depending upon age, makeup, and orientation of the face, as well as distance of the observer. Texture is highly influenced by the seasonal change that occurs in this region; many vegetative textures change from season to season.

The viewing distances and sense of scale in this landscape are dependent upon the location of the viewer and include longer unobstructed views from the ridge tops, limited abrupt views toward the canyon walls, longer views framed and bordered by the canyon walls, and views associated with moving through a narrow canyon corridor. Widths of canyons vary, creating areas of various spatial proportions on the canyon floor. Some of these areas are narrow and constricted, with very focused and enframed views, whereas others are more open with broad views of expansive ridges.

Human influence is evidenced in the landscape as remnants of rock art and dwellings from early inhabitants, some agricultural fields in the canyon bottoms with associated dwellings, roads, and fences, some residential dwellings and associated structures, and burned areas. There are landscape disturbances from oil and gas development, including compressor stations, a network of pipelines, and producing wells.

### **3.3.13 Geology/Minerals**

The WTPPA is located above and northeast of the Roan Cliffs, a northwest/southeast-trending, south-facing, sinuous escarpment that defines part of the southern flank of the Uinta Basin (Weiss et al. 1990). The Uinta Basin is a structural and topographic basin containing a thick succession of lower Tertiary lacustrine and fluvial sediments. The sedimentary beds dip gently to the north in the WTPPA. Beds exposed in the WTPPA are the upper and middle members of the Green River Formation and the underlying Colton Formation. Lithologies of the Green River Formation are marlstone, mudstone, limestone, siltstone, sandstone, and shale that alternate irregularly. Many thin beds of oil shale are present in the lower section of the upper member. Lithologies of the underlying Colton Formation are

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mudstone and shaly siltstone inter-layered with thin sandstone. The raised West Tavaputs Plateau is underlain and held up by these geologic units.

The gently northeast-dipping surfaces of the plateau within the WTPPA are dissected by southwest/northeast-trending canyons. The upper and middle members of the Green River Formation are exposed in the canyons (Weiss et al. 1990). These canyons begin in the highlands near the Roan Cliffs and become increasingly deeper toward Nine Mile Creek Canyon to the northeast.

Slopes in the canyons after range from 40 percent to 50 percent; however, both less steep and even steeper slopes occur. In localized situations, slopes are nearly vertical along the edge of the plateau and in the bottoms where stream action has cut vertical walls and cleared the colluvium and fallen rocks. Rock fall is the main form of mass wasting in the canyons. One landslide has been mapped in the WTPPA (Harty 1991). The slide is located in a canyon tributary to Jack Creek Canyon in Section 18, T13S, R16E. The consolidated rocks of the Green River Formation are quite stable when exposed, and this stability lends to the perseverance of cliffs. Rock falls are generally the result of freeze/thaw action and gravity as the rocks slough off slowly over time.

Oil and gas production in the WTPPA is from several anticlinal geologic structures that have been successfully drilled for gas (Weiss et al. 1990). Production from the Peters Point-Stone Cabin gas unit produces primarily gas and, in the past, some oil from the Green River and Colton Formations at a depths of 2,800 to 4,300 feet (Weiss et al. 1990). There are 61 oil and gas wells within and immediately adjacent to the WTPPA, of which 27 are capable of producing natural gas. Thirteen of the 27 wells are currently producing, whereas the other 14 would require either an upgrade of delivery lines or recompletion before they could produce. The remaining 34 wells are abandoned.

#### **3.3.14 Wild Horses and Burros**

The WTPDP occurs within the Flat Iron and Horse Bench portions of the Range Creek Wild Horse Herd Management Area (HMA) (see Figure 3.5). The HMA has an appropriate management level, established through the Price MFP and the Range Creek Herd Management Area Plan (HMAP), of 75-125 horses. At present, an estimated 106 horses occupy the HMA. The WTPPA is primarily a winter use area for the horses. The limiting factor for year-round use is an inadequate source of permanent water. In order to keep the herd at the prescribed management level, occasional horse gathers are required.

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**3.3.15 Non-Wilderness Study Area (WSA) Lands With Wilderness Characteristics**

Lands that have been determined to have wilderness characteristics occupy approximately 7,089 acres of the WTPPA (BLM 1999). There are two distinct areas affected, one associated with the Jack Canyon WSA and the other associated with the Desolation Canyon WSA (Figure 3.5).

The lands associated with Jack Canyon WSA appear natural, although there is evidence of past oil and gas exploration in the form of old seismic lines, vehicle ways, and two reclaimed drill holes. Vegetation and topography provide ample screening of these minor intrusions, so they are substantially unnoticeable within the area as a whole. The lands with wilderness characteristics have outstanding opportunity for solitude when considered with the contiguous Jack Canyon WSA. These lands also provide outstanding opportunities for primitive and unconfined recreation activities in conjunction with the Jack Canyon WSA. The expansive views into the Desolation Canyon WSA enhance the experiences related to primitive and unconfined recreation. The Jack Canyon WSA includes 7,500 acres, and the associated lands with wilderness character include approximately 3,600 acres.

The lands associated with the Desolation Canyon WSA appear natural. There are many scattered human imprints, but their individual and cumulative impact on the natural character is minor. The imprints are in various stages of rehabilitation, with most being substantially unnoticeable in the area as a whole. The expansive landscape, diverse topography, and vegetation screens the scattered human intrusions. Most of the important or noticeable intrusions are located outside its boundary. The lands are contiguous to the Desolation Canyon WSA and enhance the outstanding opportunities found in the WSA. The lands with wilderness characteristics are of sufficient size and configuration to provide opportunities for solitude and primitive and unconfined recreation on their own. Together with the WSA, the lands comprise a large remote area where a visitor is truly isolated from the outside world. The Desolation Canyon WSA is the largest in the lower 48 states, encompassing 290,845 acres. The non-WSA lands with wilderness characteristics, north and west of the WSA and west of the Green River include approximately 42,000 acres.

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